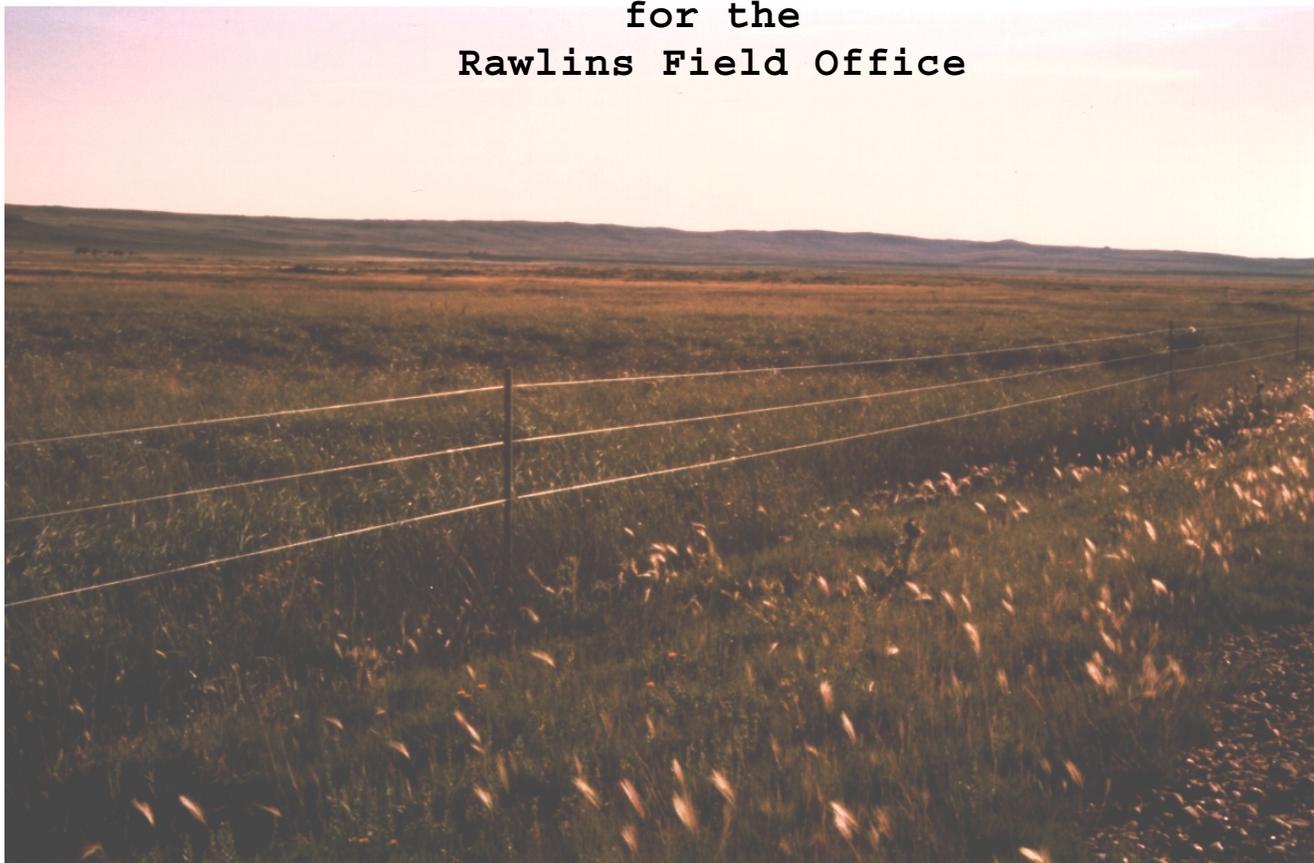


Revised Interim Electric Fence Policy

for the
Rawlins Field Office



May 2001

U.S. Department of the Interior
Bureau of Land Management

In response to the large number of electric fences that have been built and are proposed to be built within the Rawlins Field Office, an interim electric fence policy has been developed. Many people have helped develop and/or provided information for this interim electric fence policy, including:

BLM Library-Literature Search
Rawlins Field Office
Wildlife Staff
Andy Warren-Rangeland Management Specialist
Clark Whitson-Civil Engineering Technician
Alberta Settle-Civil Engineer
Walt George-Assistant Field Manager/Resources
Everet Bainter-NRCS State Conservationist
Bob Leinard-NRCS, Montana
Steve Kerpin-Range Specialist-Medicine Bow National Forest, USFS
Joe Glode and Morgan Renner-Gallagher Fencing
Niels Hansen-PH Livestock
Peter Theriot-Elk Mountain Ranch
Overland Trail Cattle Company
Bill Nation-Carbon County Road and Bridge
A.G.R. Fencing LLC
Wyoming Department of Transportation
Wyoming Game and Fish Department
Ila Peterson
30 Responses from electric fence users within the Rawlins Field Office

Other BLM Offices Contacted:
Rock Springs Field Office
Dennis Doncaster-Hydrologist
John Henderson-Fisheries
Kemmerer Field Office
Carl Bezanson-Rangeland Management Specialist
Cody Field Office
Jerry Jech-Natural Resource Specialist
Casper Field Office
Charlie Fifield-Rangeland Management Specialist
Buffalo Field Office
Janelle Gonzalez-Rangeland Management Specialist

This document was prepared by Cheryl Newberry-Rangeland Management Specialist. In response to Wyoming Game and Fish Department comments, this policy was revised. For additional information contact Cheryl at (307)328-4228.

BACKGROUND:

Historically, western range fences were built to control sheep and cattle. In the Rawlins Field Office area, standard fence designs included woven wire, woven wire with one to two strands of barbed on top, and three, four, five and six-strand barbed wire fences. USDI BLM and USDA Forest Service published a fence handbook (1988) that discussed numerous fence types and wire spacings. Wire spacing varied both with the type of wildlife using the area and with the livestock being controlled. New barbed wire fences in the field office follow specific wire spacing standards (BLM Manual Handbook-1741-1 Fencing).

Electric fences are also discussed in the handbook, but with no details on wire spacing. The Rawlins Field Office has permitted over 20 electric fences (>96 miles) on public land since 1990. The majority of these fences are three-wire, with the top and bottom wires electrified, and are on during spring/summer/fall. In addition, most of these electric fences have been similar to conventional fence spacing standards (bottom wire 16 inches from the ground and top wire no higher than 42 inches).

One of the first electric fences permitted in this region was cooperatively funded by Gallagher Fencing, the Wyoming Game and Fish Department, and the permittee. This three-wire electric fence was built to study electric fence impacts on pronghorn antelope movement. The top wire was 42 inches high and electrified, and the bottom wire was 18 inches and electrified. The WGFD paid for the materials. After occasional observation of the fence, and no modifications were recommended. This electric fence

has been in place since 1990 and is not known to have adversely affected antelope movements during any season of the year (personal communication-permittee Steve Adams).

Three fences (both permanent and temporary) built in the Grizzly allotment (a WGFD habitat unit) have been electric. The WGFD cooperatively funded the last permanent electric fence built in this habitat unit (approximately 5.5 miles). The permanent electric fences are three-wire with the top and bottom wires electrified. Since these fences have been in place, there have been no known problems with wildlife passage, and there have been many observations of large numbers of wildlife passing through the fence.

Absent demonstrated adverse reaction to the electric current, electric fences may offer some advantages over conventional barbed wire fences. The smooth wire has no barbs on which animals get caught. Wire spacing of 12 inches between wires prevents big game from getting a foot caught between two wires and allows easier passage between wires. And the tensile strength of this wire along with wider post and brace spacing allows the fence to give more without breaking when one or more animals cross over it.

Requests to build other types of electric fences have recently been proposed. These include four and five-wire electric fences with different wire spacing than suggested in the fence handbook. A few years ago, BLM received a request to build a three-wire electric fence with a 50 inch top wire. After consultation with the WGFD, the top wire was dropped to 42 inches on the portion of the fence built on public land.

A literature review of information regarding wildlife, wildlife passage, and electric fence and control was done on three scientific databases during the winter of 2000. Articles gathered by NARSC (National Applied Resources and Science Center) were reviewed for content and applicability. Many articles addressing wildlife damage control and electric fence design, but no articles were located that specifically addressed wildlife passage through electric fences. Therefore, this office contacted several electric fence users and collected information (Appendix A). The majority of electric fence users have noticed less impact on wildlife movement than conventional fences, whether the fences were electrified or not.

An electric fence study proposed by the Wyoming Cooperative Fish and Wildlife Research Unit (and funded by UW, WGFD, and BLM) was started in the spring of 2000. This study will analyze numerous types of electric fences but is not scheduled for completion until 2002. Upon completion of this study and other available information, this interim policy may be updated.

RAWLINS FIELD OFFICE INTERIM ELECTRIC FENCE POLICY

One, two, and three-wire electric fences may be built on public lands, as long as the top wire is no higher than 42 inches from the ground and the bottom wire is a minimum of 16 inches from the ground. If the bottom wire is 16 inches, it will not be electrified to allow antelope passage; a 20 inch bottom wire spacing will be required if the wire is electrified. A 42 inch top wire is passable by mature mule deer and elk, whether electrified or not.

The middle wire should be a minimum of 12 inches below the top wire. Electric fences are psychological barriers to livestock movement more than physical barriers; therefore, if livestock are properly trained, three wires or less should be effective. To avoid damage to new fences, flagging the new wires may help reduce wildlife impact on new fences.

More restrictive fences (i.e., additional wires or different spacings) will require case-by-case review. In addition, fences that will be electrified for long periods of time (especially during critical wildlife periods) may require additional evaluation.

Documentation of impacts to wildlife caused by more restrictive fences will be determined and mitigated. In areas of special concern, such as crucial winter ranges, monitoring and evaluation may be required.

In addition, electric fences within the field office will have warning signs posted at all reasonable public access points. Areas of heavy public use may require fence ladders or crossings. All previously permitted electric fences will be retrofitted with signs.

This is an interim policy for the Rawlins Field Office. As additional information is collected, modifications may be made to the above policy. Construction specifications are available from the Rawlins Field Office.

WILDLIFE PASSAGE

Interim electric fence policy states that "One, two, and three-wire electric fences may be built on public lands, as long as the top wire is no higher than 42 inches from the ground and the bottom wire is a minimum of 16 inches from the ground. If the bottom wire is 16 inches it will not be electrified to

allow antelope passage; a 20 inch bottom wire spacing will be required if the wire is electrified. A 42 inch top wire is passable by mature mule deer and elk, whether electrified or not. The middle wire should be a minimum of 12 inches below the top wire.

Extensive research has been done on conventional fence wire spacing regarding wildlife passage. The following citations are representative of the many articles that recommend the same general spacings. The wire spacings in the interim policy are supported by the following references. Generally, antelope will pass under wire 16 inches above the ground (NRCS, NHCP April 1995, Yoakum 1980, WGFD Habitat Extension Bulletin No. 53). Most deer can easily jump a 42-inch fence (Fences, USDI BLM, USDA FS, July 1988 2400 Range, Anderson and Denton 1980). The Colorado Division of Wildlife and the Wyoming Game and Fish Department agree that a 42-inch height is the maximum for mature deer passage. The Wyoming Game and Fish Bulletin goes on to say the adult elk can jump all but exclusion fences.

Many articles also agree that a minimum of 12 inches between the top and middle wire will reduce entanglement of jumping animals (Fences, USDI BLM, USDA FS, July 1988 2400-Range, WGFD Habitat Extension Bulletin No. 53).

Electric fences built to the Rawlins Field Office standards provides for a flexible fence.¹ Many experiences in the Rawlins Field Office area have shown that for individual animals approaching an electric fence, antelope go under and deer and elk jump over. When these animals are in large numbers they run right through these fences, because of the fences' ability to lay down. These types of electric fences seem to have less impact on wildlife movement than the conventional fence type. In addition, there have been no reports or documentation of animals

entangled or injured by existing electric fences within the area.

LIVESTOCK CONTROL

Electric fences are psychological barriers to livestock movement more than physical barriers; therefore, if livestock are properly trained, three wires or less should be effective.

Livestock must be properly trained to respect electric fences, if they are not, they often successfully challenge the fence. In addition, livestock have lower tolerances for electrical shock than wildlife (Steger, 1987).

	For Control
Cattle	2000 volts
Horses	2000 volts or less
Swine	2000 volts
Sheep	>3000 volts
Goats	>3000 volts
Deer	>4000 volts
Elk	>4000 volts
Coyotes	>4000 volts

Deer, antelope, and elk also have hollow hair, which provides an insulating effect, thereby increasing the voltage needed for dependable control. In wintertime, electric fences are less effective due to the deep, dry snow and heavier coats on wildlife and livestock (WGFD Habitat Extension Bulletin No. 53).

To avoid damage to new fences, flagging the new wires may help reduce wildlife impact on new fences.

The NRCS recommends flagging new fences so resident wildlife are able to see fence heights and adjust accordingly (NRCS, NHCP April 1995)

More restrictive fences (i.e., additional wires or different spacings) will require case-by-case review. In addition, fences that will be electrified for long periods of time (especially during critical wildlife periods) may require additional evaluation.

Documentation of impacts to wildlife

caused by more restrictive fences will be determined and mitigated. In areas of special concern, such as crucial winter ranges, monitoring and evaluation may be required.

The United States federal courts have established precedence, under the Unlawful Inclosures Act (USC Annotated Title 43, Public Lands, Chapter 25 s 1061), that fences are not to impede animal movements to critical winter range on public lands. Presently, no electric fences within the Rawlins Field Office area have been identified as impacting wildlife movement.

PUBLIC SAFETY AND ACCESS THRU ELECTRIC FENCES

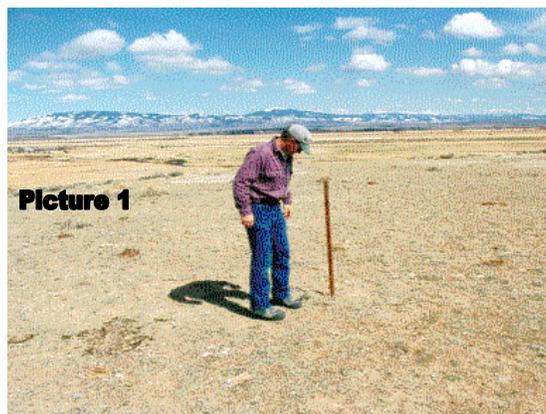
In addition, electric fences within the field office will have warning signs posted at all reasonable public access points. All previously permitted electric fences will be retrofitted with signs.

Generally, electric fences in the Rawlins Field Office have had minimal impacts on public recreation. With the exception of one allotment, no complaints regarding electric fences and related safety issues have been filed. Most electric fences that have already been permitted are usually not electrified during heavy recreation use during the fall.

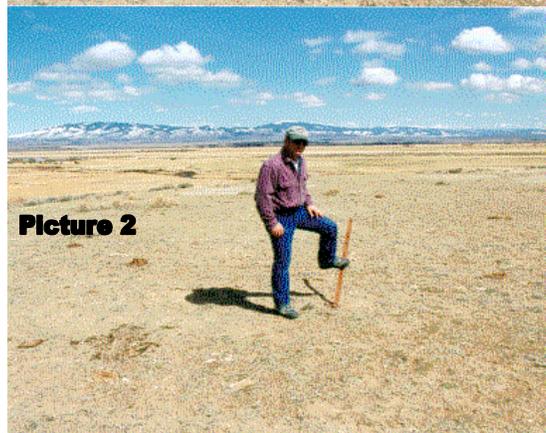
All electric fence manufacturers must comply with national standards (UL69) to ensure they are safe for people. These standards even attempt to require safe outputs even under abnormal operating conditions (which may include power supply variations, faulty components, etc). The safety record of low impedance, impulse type electric fencing shows that use of electric fencing provides an insignificant additional hazard to the environment (Walley 1994).

Posting signs on electric fences to notify the recreating public will raise awareness of the different fence type. In cooperation with the Rawlins Field Office interim policy, Carbon County has also implemented a signing policy for electric fence.

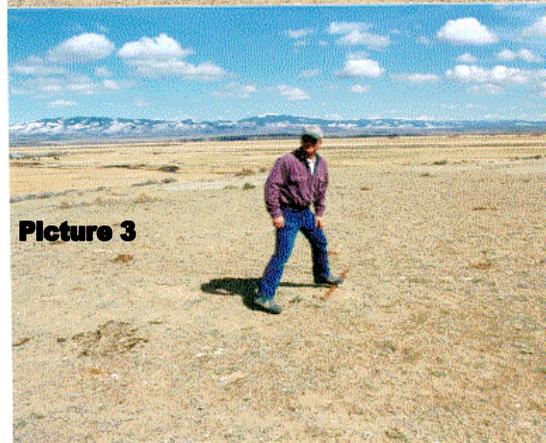
New electric fences will not have electrified gates, but will have standard wire or steel gates for public access. Passing through electric fences is in many cases much easier than crossing a standard fence. Flexibility of the high tensile wire allows the fence to be pushed to the ground or lifted to allow passage. Pedestrians can step on a stay and walk right over the fence (see pictures 1, 2, and 3).



Picture 1



Picture 2



Picture 3

Four-wheelers can easily pass under an electric fence (pictures 4 and 5), and vehicles can be driven over the fence.

When approaching an electric fence, the public should assume it is electrified unless informed otherwise. In most cases, the wires that have the insulators are the "hot" wires, and the wire stapled directly to the wood post is the ground or "cold" wire. Some fences have insulators on all the wires to

provide flexibility as to which wire(s) are electrified. Any non conducting material can be used to touch the electric wires, such as wood or rubber.

In the future, a brochure explaining electric fences and their safety will be developed to help the public further understand this relatively new tool.



¹ Average spacing between posts should be 80 feet (closer on rough terrain and farther apart on rolling terrain). Wide spacing of posts greatly increases fence flexibility, which allows the fence to be pushed to the ground between posts.

In addition, 170,000 psi wire is preferable to 200,000 psi wire because of its improved flexibility. Maintenance of the wire is easier too, because crimping tools or sleeves are not required.

For further information on electric fencing specifications please contact the Rawlins Field Office.

Literature Cited

Steger, Robert E. Electric Fencing. Rangelands 9(4), August 1987 pp. 153-155.

U.S. Department of the Interior. Fencing. BLM Manual Handbook H-1741-1. Bureau of Land Management. 1989.

Walley, John L. A General Report regarding the Safety of Electric Fences. Gallagher Power Fence, USA, April 1994.

Yoakum, J.D. 1980. Habitat management guidelines for the American Pronghorn antelope. Page 55 in U.S. Bur. Land. Manage. Tech. Note 347

_____ Fencing Guidelines for Wildlife, Wyoming Game and Fish Department, Habitat Extension Bulletin No. 53.

_____ Habitat Partnership Program Newsletters, Colorado Division of Wildlife, April 26, 1993.

_____ Natural Resources Conservation Service Conservation Practice Standard, Fence, Code 382, April 1995.

_____ Underwriters Laboratories, Inc. Electric - fence controllers - Standard for safety. Underwriters Laboratories, Inc., UL 69, 2000.

The draft interim electric fence had many more scientific references, if more information or references are needed, please contact Cheryl Newberry at 328-4228.